Docket No. 50184

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S):	Mori et al.	EXAMINER:	J. Chu
U.S.S.N.:	08/726,613	GROUP:	1752
FILED:	October 7, 1996		
FOR:	DYED PHOTORESISTS AND METHODS AND ARTICLES OF MANUFACTURE COMPRISING SAME		

32/cr

Commissioner of Patents
P.O. Box 1450
Arlington, VA 22313-1450

SUPPLEMENTAL RESPONSE

Enclosed is the Declaration under 37 CFR 1.131 for the above-identified application as signed by inventor Manual DoCanto, which the undersigned attorney has now received.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,

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DECLARATION UNDER 37 CFR 1.131

The undersigned declare as follows:

1. We are co-inventors of the above-identified application ("the application") assigned to the Shipley Company.

2. Prior to June 1996, we had conceived of, made and lithographically processed photoresist compositions that contained a photoacid generator, a resin binder and a polymer dyes that contained one or more polycyclic chromophores that could reduced undesired reflections of exposure radiation. We found that preferred chromophores were those that contained carbocyclic or heterocyclic polycyclic moieties, such as anthracene. We also found that preferred dye compounds were polymeric.

3. Prior to June 1996, one or more of us had coated such photoresist compositions onto substrates, particularly microelectronic (silicon) wafers, exposed the applied photoresist layers to activating radiation particularly radiation having a wavelength of 248 nm, and then the latent imaged formed in those photoresist layers were developed to provide a photoresist relief image by treating the exposed resist layers with an alkaline aqueous developer solution. As evidence thereof, attached as Exhibits 1 and 2 are true copies with dates deleted of notebook records of one of us. The disclosure attached as Exhibits 1 and 2 was generated, and actual experimental work disclosed therein was performed, prior to June 1996. Exhibit 1 shows that photoresists with dye compounds were prepared to test lithography. As shown in Exhibit 1, the prepared photoresists included a resin that was a copolymer of vinylphenol and t-butylacrylate (Poly-E), an onium salt photoacid generator of di-t-butylphenyliodonium camphorsulfonate, a basic stabilizer of a lactate salt of tetrabutyl ammonium hydroxide, solvent of ethyl lactate and a dye compound. The dye compounds of the prepared photoresists included ANTMA/HEMA which was a copolymer of methylanthracene methacrylate and hydroxyethyl methacrylate having a molecular weight in excess of 5,000 as disclosed in Example 1 of the application. Exhibit 2 shows lithography results of such photoresists with specified dye compounds, including a photoresist containing having the dye compound of an ANTMA/HEMA polymer.

4. We hereby further declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, and that such willful false statements may jeopardize the validity of the above-identified application or any patent issued thereon.

Date: _____ _____
James M. Mori

Date: _____ _____
James W. Thackeray

Date: _____ _____
Roger F. Sinta

Date: _____ _____
Rosemary Bell

Date: _____ _____
Robin L. Miller-Fahey

Date: _____ _____
Timothy G. Adams

Date: _____ _____
Thomas M. Zydowsky

Date: _____ _____
Edward K. Pavelchek

Date: 7/22/03

Manuel DoCanto

Manuel DoCanto

Prepare resists with dyes for lithographic evaluations.
Preparation: make up master batches of dyes and DTBPIOCS

2-Acetylphenothiazine: 0.1987g
FLEX: 19.6643g
% solids: 1.00%

Anthraquinone: 0.2044g
FLEX: 20.2304g
% solids: 1.00%

Curcumin: 3630g
FLEX: 36.159g
% solids 1.0%

ANTMA/HEMA: use 5% soln prepared on page 12 (RB2512B-12A)

DTBPIOCS: 2.0900g
FLEX: 18.6428g
% solids ~~10%~~ 10.1%

FLEX LOT # ET 806 DA
DTBPIOCS LOT # ARC 1924-69-2

All measurements were made on balance MRAD 22.
Solutions were placed on the rollers for mixing at 3:20 pm.

Solutions were removed from the rollers at 9:00 am. All are completely dissolved.

Make up resists with dyes to test lithography, absorbance.

RB2512B-22A: 2% ANTMA/HEMA
-22B: 2% 2-Acetylphenothiazine
-22C: 2% Anthraquinone
-22D: 5% Curcumin
-22E: No dye

} Poly-E (KE-610), 3% DTBPIOCS, 0.2% TBAH, 0.5% PHASE in FLEX @ 16% solids

Lot #'s used:
Poly E KE-610 (solid)
DTBPIOCS: ARC 1924-69-2 (10% solution)
PHASE: 23552F012892 (10% solution)
FLEX: ET 806 DA

TBAH: 10% soln prepared by P. Hagerty

Continued on Page 23

Read and Understood By

Rosemary Bell
Signed Date

Sheri L Allsop
Signed Date

Exhibit 2

Notebook No. 2512B

OJECT ESCAP dye

Continued From Page 37

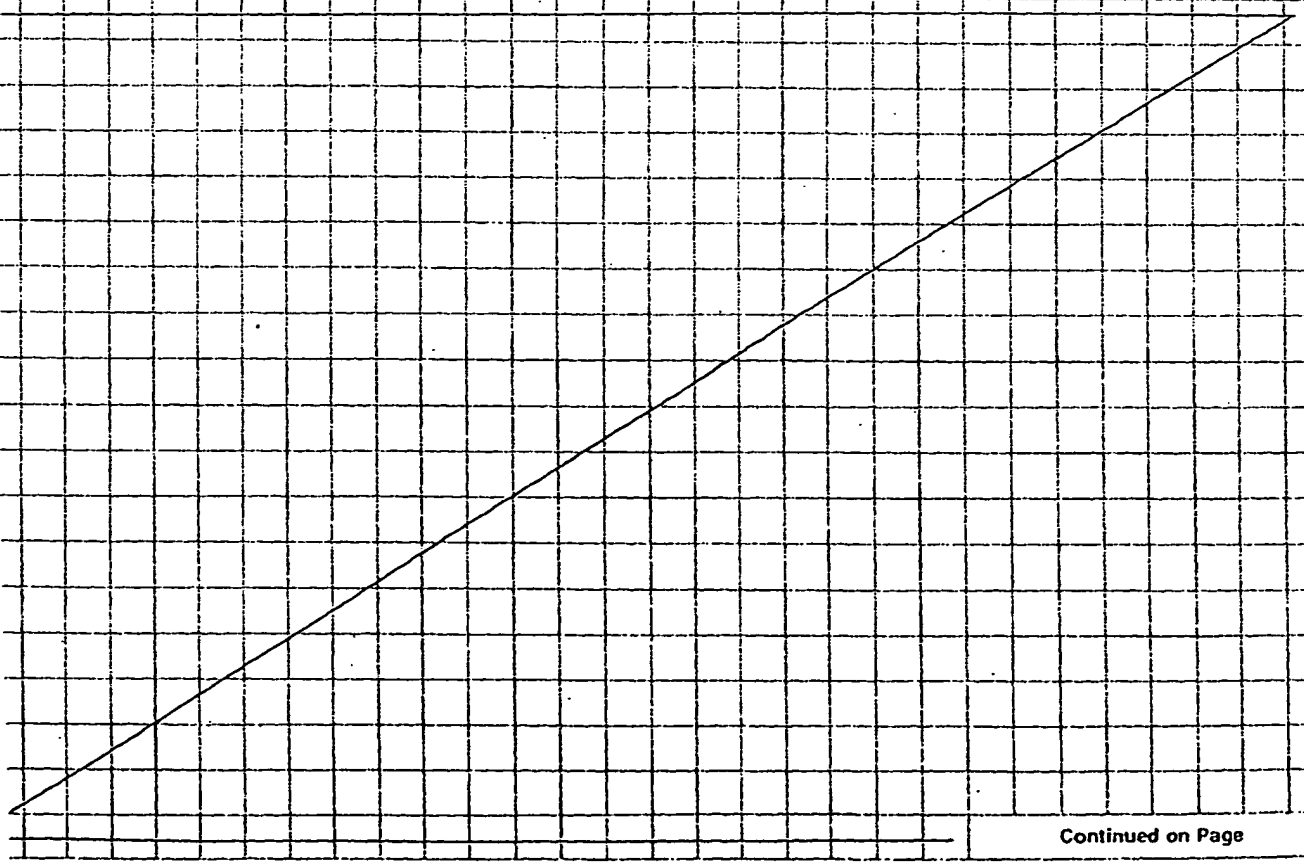
Sem Results cont'd

	Resolution, µm	Masking Linearity, µm	Focus Latitude		Exposure Latitude
			Optical, µm	Measured, µm	
XP-9549A	0.23	0.23	1.4	>1.0	±10.4%
with ANTMA/HEMA	0.23	0.23	1.2	1.4	±12.3%
with Acetylphenothiazine	0.24	~~0.20~~ 0.24	1.0	>0.8	±10.5%
with Anthrarobin	0.23	0.23	1.2	1.6	±8.8%
with Curcumin	0.24	0.24	1.0	1.4	±7.9%

Note: Focus and Exposure Latitude were measured to ±10% CD change. (CD = 0.30µm)

RB2512B pg 38 RB

Based on the above, the ANTMA/HEMA dye looks very promising. DOF is comparable to the control and the exposure latitude is better. masking linearity for the dyed resist and control are the same.



Continued on Page

Read and Understood By

Rosemary Bell — Signed — Date

Sheri L Aldaya — Signed — Date